The River Mile

Site Mapping

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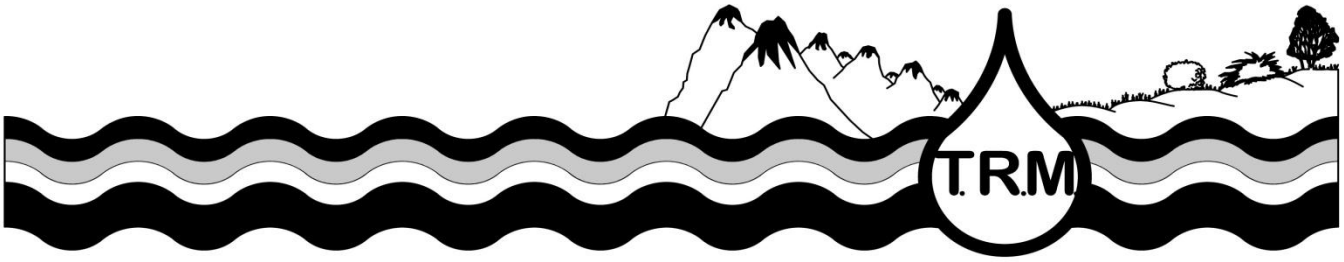

"Awakening Inquiry"
Unit 6: Read and Use Maps

Subject:	Directions, mapping techniques, technology, latitude and longitude, compass use, maps (use and types), scale, and model
Duration:	6-8 hours broken into 1-2 class periods per lesson
Location:	School Site/classroom
When:	Pre-Visit, site visit, and post visit
Grade:	3-12th

Objectives:
Students will be able to:

a) Understand cardinal directions
b) Practice using maps
c) Learn how to use a compass
d) Use a GPS unit and understand latitude and longitude coordinates

Materials: Variety of paper sizes, markers, grid paper (poster size and 8 1/2x11), compass, variety of maps, field journals, note cards, world globe, GPS units, "Awakening Inquiry" guide available through NatureMapping and other items listed in "Awakening Inquiry."

Procedure:
Pre-Mapping Lessons
Use "Awakening Inquiry" Unit 6 to prepare your students to create a map of your site.

Background Information:
See "Awakening Inquiry" and "The Nature Mapping Program Global Positioning System (GPS)"

The River Mile Site Mapping

Subject: Record keeping, mapping techniques, technology, latitude and longitude, GIS
Duration: 3-4 hours broken into 3 sessions
Location: The River Mile Site, classroom
When: Pre-Visit, site visit, and post visit
Grade: 3-12th

Objectives:
Students will be able to:

a) Use a GPS unit and understand latitude and longitude coordinates
b) Use skills learned to take GPS waypoints and routes to create map of the school's river mile site
c) Use a digital camera to record site locations
d) Use record sheets to record data
e) Use tape measure to take measurements of site facilities and features

Materials: Grid paper (poster size and 8 1/2x11), field journals, GPS units, aerial photographs of school grounds and river mile site, clipboards, pencils, tape measures, digital cameras, record sheets.

Procedure:
Pre-site visit Preparation of Students

1) Complete "Awakening Inquiry" Unit 6
2) If your class has not been to your site before have them visit their site through the "Habitat Observation" program which you can conduct or, if you are using a site at or near Lake Roosevelt National Recreation Area, you may ask a National Park Ranger to conduct the program.
3) In the classroom prior to the site mapping visit divide the class into small groups, preferably 4-5 students maximum per group.

a) Have students decide within their group who will be doing what assignment (or make assignments yourself) : record keeper, photographer, GPS user, Measurers (2)
b) Practice assignment on school grounds

Pre-visit Preparation for Site Mapping prior to working with students (older groups can do this themselves)

1) Decide what features you will be mapping
2) Assign each group an area of the site or feature groupings (e.g., trees). The size of the assigned area or feature is determined by the size of your site, the number of small groups, and how much time you have to complete the assignment
3) Mark areas on aerial photos the assigned areas (color coded is preferable)
4) Utilizing the record sheets customize them for your site and groups
   a) Record sheets include
      i) Roads
      ii) Boat launch and facilities
      iii) Vegetation
      iv) Recommendations
5) Secure one adult chaperone for each group
6) Train adult chaperones OR create or use the written instructions provided

Site Visit

1) Arrival
   a) When you arrive at your site have students gather in their assigned groups.
   b) Distribute supplies and materials to groups. Materials need to be labeled or numbered and be sure to record which group has which equipment. NOTE: It is easiest to number the groups and give each group all materials with the corresponding group number. Invariably you will need to check with a group or refer back to the GPS unit or camera to answer questions.
      i) Record sheets
      ii) Aerial photographs
      iii) GPS units
      iv) Digital cameras
      v) Clipboards
      vi) Tape measures
   c) Remind of site visit rules and behavior expectation of student scientists and researchers
2) On-Site Mapping Procedures
   a) Group Assignments

(1) Roads

Take waypoints with GPS unit. Start at one end of your assigned section. GPS user stands in the middle of the road and takes starting point waypoint. Measurers measure the width of the road with the GPS point in the middle of the tape measure. Photographer takes photos of the group and the site. Record all data on the record sheets (Latitude/Longitude, photograph number(s), road measurement and any notes about the location. Move 15-25 steps from this location and repeat. How far is determined by the size of your area being mapped, the amount of time you have and the number of groups.

When doing a loop or spur, place a flag or other marker at the beginning of that spur or loop and GPS that spot. Then when the section is completed, return to the starting location of that loop and begin there for the rest of the road.

(2) Boat Launches and other human-made site features

For large parking areas you will take readings of the outline of the lot, measure from one side to the other in at least 3 locations on each side. Be sure to place a marker at your beginning location so when you finish the outline you end at the correct location. For buildings follow above procedures, except measure the sides instead of across.

Follow all other instructions for road mappers.

(3) Vegetation

For individual trees or other vegetation that are safe to get to, take a GPS waypoint reading right next to it. For groves of trees or other vegetation, take GPS readings that outline the grove (like boat launches or buildings). Take waypoints at least 10 feet apart and at all corners or turns. Identify trees and vegetation as able.

b) Once all groups have returned, have them double check their information and make sure they have their names and equipment information on their record sheets. Then collect all equipment, materials and record sheets.

3) Wrap-Up Preparation

a) How data is transferred and coordinate with the aerial photograph depends on the group's level. The more advanced groups can begin work with simple GIS

programs. If your program is conducted by a National Park Ranger the National Park Service can transfer and create your map if needed, although there are free and easy programs you can use to do simple mapping. ArcGIS Explorer On-line could be used by all groups.Contact ESRI for more information.

b) Have students enter the data collected during the site visit on the data sheets into a database such as Excell. This file can be used by GIS programs.

Post-Visit

a) Show students the photographs of your site and coordinate them with the aerial photograph(s).
b) Have student create slideshows in ArcGIS On-line and/or Powerpoint.
c) Discuss what students learned. Are there any areas of your site which the students think need to be remapped or investigated further? Why?

Note: Creating maps of the variety of data you collect at your site is presented the same way. When you take samples and GPS that location you can prepare a map of your sample locations for whatever data you collect.

Background Information:

See "Awakening Inquiry" and "The Nature Mapping Program Global Positioning System (GPS)"

GIS Training as needed and appropriate for level.